Institut für Höhere Studien (IHS), Wien
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An Applied General Equilibrium Analysis of EU Integration for Hungary and Slovakia

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Abstract

The implications of integration with the European Union on the labour markets of Central and East European transition economies have been neglected in the literature. We build an Applied General Equilibrium Model for Hungary and the Slovak Republic and simulate the integration process with specific reference to the labour markets in these economies. The results show that the effects of joining the preferential trading arrangement of the EU are context dependent. Labour markets in the Slovak Republic are more sensitive to the trade diverting effects of this form of integration than those of Hungary. This is especially the case for the utilisation of skilled labour and can be justified by the structural differences between the two economies. This would imply that Slovakia has a lower potential for building on the existing human capital capacities. For Hungary, since the EU is the dominant trading partner, the scope for diversion and the resulting structural distortions in the labour market remain limited.

Keywords

Computable general equilibrium, transition economies, international trade, labour, integration

JEL Classifications

D58, F15, J21, P33

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Contents

I. Introduction

With the transformation process of the former centrally planned economies (FCPE) and the re-rationalisation of the economic processes of these economies, the possible form of trade relations that the FCPE countries might have with the outside has become an important factor in underlying the long-run growth potential of each country. As FCPE, specifically those in Central and Eastern Europe (CEE), are generally small economies, the relevance of advantageous international trade to their ability to produce a viable economic base built on decentralised economic decision making underscores the dilemmas of reorientation and reintegration of the trade sectors faced by the policy makers. In this light, trade liberalisation became one of the priorities of the transition process in the majority of the FCPE allowing the influx of imports from non-FCPE.

Although strengthening the re-rationalisation of production in FCPE internally, trade liberalisation has continuously been an asymmetric process in which the political dimensions of consequences of liberalised trade have imposed limits to access to export markets. Having generally looked to the West, and specifically to the European Community/European Union (EC/EU), the transforming economies began to face the same barriers encountered by "Southern" exporters in selling commodities in which they have had a comparative advantage. (Rajabiun, 1997) The principle components of the EU/CEE agreements reflect effective patterns of market protection with respect to their sensitive industry components and various non-quantitative restrictions such as content clauses. (Winters, 1992)

This has given rise to what Brunner (1996) describes as the "dual nature" of former socialist economies' trade: "export sales to other Socialist markets resembled in their composition those of Western industrialised economies, export sales of socialist markets to the West were largely of products with high energy and raw material content." This composition of exports implies low levels of value added for Western oriented exports. This evidence is confirmed by Rodrik (1994) who finds "no evidence" that higher value added output previously sold by the four Central European[1] economies to the former Soviet Union have had any success in finding markets in the West.

Brunner elaborates on the possible scenarios of further development during the transition period. According to the first scenario, CEE countries could gradually revert to an export structure with "high content of cheap, low skilled labour" (Neven, 1994). This would mean that the region's generally high-skill labour and heavy capital concentration would be ignored and the potential long-run advantage (after some restructuring, investment) could be foregone. This transition route would favour sectors which can in the very short run produce easily marketable products and services. Such short-run structural distortions might produce irreversible loss of

[1] Poland, Hungary, Czech, and Slovak Republics.

long-run comparative advantage. Under this scenario, CEE economies would have to increasingly price compete with newly emerging Southern market economies in order to overcome short-run structural distortions and replace lost aggregate capacities.

The second scenario would envision the utilisation of existing capacities (physical and human) from the very beginning of the transition process and upgrade them with new investment. This route could avoid the danger of short-run structural distortions and would be a way of attaining a superior long-run equilibrium path.

Recognition of the existence of multiple equilibria in the development process accentuates the importance of policy in general, and trade policy in our case, during the transition period. Research in modern economic development theory emphasises the importance of choice of action in the determination of a long term growth path. For example, Murphy, Shleifer, and Vishny (1989), Rodrik (1993), and Chin and Grossman (1990) demonstrate the possibility of multiple equilibria in different contexts of policy choice.

Here, the developmental significance of micro-structural changes due to different trade arrangements is built on the hypothesis that trade policy choice can place the economy on different long-run growth paths. Utilisation of available resources, such as human capital, that can lend themselves to the production of higher value added goods, can place the economy on a superior growth path. Conversely, the transformation of the production structure in a manner conducive to the production of goods with relatively low value added, such as those that resemble the FCPE exports to the West, may place the economy on an inferior equilibrium path.

In a similar fashion, accession to a preferential trade arrangement such as that of the EU can have distortionary effects. Beyond its static welfare implications due to higher prices, trade diversion can lead to dynamic losses and an inferior growth path if there were factor substitution associated with the use of less efficient resources. This issue would exacerbate if trading arrangements were specified by content requirements. Concurrently, in accordance with the First Welfare Theorem the allocation of resources to ‘favoured’ industries can lead to production structures less efficient than the non-distortionary solution.

In light of the consideration of potential multiple equilibria we adopt a static general equilibrium framework to capture structural effects of policy which can signal emergent production structures. We focus our attention to the structural effects of trade policy choice on the labour markets in Hungary and the Slovak Republic. We place the analysis in the context of preferential trade integration literature, since joining the trading structures of the European Union are the political imperative of the governments of both countries.

Section II explains the theoretical grounding of the analysis. In the next two sections, we present modelling options and the rationale behind them. In section V we present the model, while section VI describes the calibration process and simulations of different scenarios that we consider. Section VII provides a summary of the results and institutional base for interpreting the results. Section VIII concludes.

II. Theoretical Motivation

The area of modern international trade theory that analyses the effects of increased integration with a trading partner rises out of Viner's (1950) work on customs unions. As part of the Theory of Second Best, the effects of discriminatory trade liberalisation are categorised into "trade creation" and "trade diversion". Trade creation refers to the aspects of increased economic interaction – volume of trade or investment – with other members of a Preferential Trade Agreement (PTA), while trade diversion encompasses those of decreased economic interaction with non-members. Welfare effects of a PTA in general remain ambiguous and context dependent[2].

One strand of the recent developments in the theory of PTAs builds on the basic Vinerian categories and forms contextual propositions, pertaining to the prospect of the welfare effects of a PTA. Michaely (1998), classifies these propositions to "orthodox" and "revisionist" categories and sets a framework for distinguishing between the differing circumstances in which each category is applicable. The "orthodox" view applies a cost- benefit analysis of trade creation and diversion, while the "revisionist" incorporates broader issues such as the implicit transfer of tariff revenue to the trading partner and the resulting worsening of terms-of-trade. Although this strand of research has made some progress in clarifying the welfare consequences of a PTA for countries with specific characteristics, much of the policy implications of the theory continue to be in dispute.

Another direction of research is related to the political economy of trade literature. Building on models of endogenous tariff formation Grossman and Helpman (1995) and Krishna (1996) demonstrate that one of the significant motivations for the formation of a PTA is gaining the benefits of trade diversion by specific interest groups.

In this light, the formation of PTAs gains importance beyond the present economic trade-off faced by a national economic policy maker between the effects of trade creation and trade diversion. If agents tend to seek the formation of parochial arrangements that limit competition and induce structural distortions through the political process, what will motivate the states to pursue further liberalisation? The phenomenon therefore becomes a central element in the

[2] An exception to this ambiguity is the Kemp-Wan theorem (Kemp & Wan, 1976).

constitution of the international trading regime: In a dynamic sense, will the emergence of PTAs become, "building blocks" or the "stumbling blocks" (Bhagwati, 1991) to the creation of a liberal international trading system?

A part of the answer to this question lies in the micro-structural consequences of different trading arrangements. Here we focus our attention on the labour market in Hungary and Slovakia. Since labour conditions tend to be an important factor in the formation of political support for liberal trade, it is important to consider the effects of economic integration on the labour markets. In particular we differentiate between skilled and unskilled labour with reference to the two described scenarios of the transition process. We highlight the effects of preferential versus multilateral trade arrangements on the relative utilisation of skilled labour, unskilled labour, and capital.

This study adds a perspective to the literature that has paid limited attention to the costs of distortionary reallocation pressures caused by policies that favour preferential arrangements. Furthermore, labour market costs in the transition economies have been neglected by studies that focus on the effects of Eastern Enlargement of the EU on the side of the incumbents. Often these studies also assume the dominance of production structures based on the use of unskilled labour in the CEE trade towards the EU.[3] In other words, this assumption precludes the realisation of the development path based on the efficient use of existing physical and human capacities. Labour market costs, generally arising from the existence of specificity, will be taken into consideration because of their importance in the transition economies. They encompass separation costs and excessive destruction accompanied by insufficient creation[4].

III. Survey of the Literature

General Overview

Research in the field of international trade in the 1970s was characterised by using neo-classical trade theory as a traditional framework. Studies maintaining the assumption of constant returns to scale and perfect competition typically found the benefits of trade liberalisation small, often on the order of 0.0-1.0 percent of GNP. Later, in the 1980s, economists started to incorporate scale economies and imperfect competition as important determinants of the impact of trade liberalisation processes. This wave integrated industrial organisation (IO) and international trade literature. (Cox & Harris, 1985) The type of model predominantly used for conducting the analysis was an applied general equilibrium (AGE) model that can accommodate different organisational assumptions. (A survey of models is provided by Shoven & Whalley, 1985.)

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[3] See for example Keuschnigg & Kohler (1997).

[4] See Caballero and Hammour (1998) for a theoretical treatment of specificity in production factor relations.

In general, AGE models can take several forms: single- vs. multi-country models or static vs. dynamic models. Each of the categories has its advantages and limitations. One of the major determinants of the choice of the type of model is data availability and data compatibility across countries and time horizons. The level of data disaggregation also influences the precision of the estimates and the implications of the models. (Kehoe & Kehoe, 1994a)

Studies incorporating AGE models have been aimed at simulating real world integrational processes such as European Union/European Community (EU/EC) enlargements (e.g. Spain's integration into the EC) and the establishment of the North American Free Trade Area (NAFTA).[5]

Single- vs. Multi-Country AGE Models

Multi-country models attempt to simulate a policy change taking place simultaneously in several countries (e.g. the establishment of a free trade area – FTA). For instance Brown et al. (1994) study all the NAFTA member economies (Canada, Mexico, and U.S.) and their interaction. The study found that the relative size of the economy matters in determining the impact of the FTA: the welfare gains, as percentages of GDP are higher for Mexico than for the other two larger economies. One obvious explanation of this phenomenon is that similar absolute gains in each country result in smaller percentages of GDP for the larger economies. Another explanation is that the United States as a "large and fairly open economy" (Kehoe & Kehoe, 1994b, p.20) has limited scope for realising further gains by exploiting increasing returns due to larger market size (Kehoe & Kehoe, 1994b).

Single-country models are frequently used in analysis, since they are less complex and their data requirements are less restrictive (e.g. data compatibility across countries). They treat the variables of the rest of the world as given, maintaining the *small country* or the *almost small country* assumption (for definitions see the Model Section below).

Static vs. Dynamic AGE Models

Static AGE models have been popular because of their emphasis on sectoral interaction: reallocation of resources across sectors of an economy and the identification of winners and losers under a policy change. However, static AGE models fail to capture dynamic phenomena involving time and uncertainty, e.g. capital flows, growth rates, demographics, etc. Exogenous shocks can be incorporated into static AGE models, but the simulation remains ad hoc (Kehoe & Kehoe, 1994a).

When time series of data (including input-output matrices) are available, econometric techniques can be used to estimate the parameters of the model. When sufficiently long time

[5] See for example Kehoe & Kehoe (1994b), Cox & Harris (1985), (1991), Dungan and Wilson (1991) and others.

series data are not available, the frequently used alternative method is to calibrate the parameters.[6]

Dynamic AGE models involve first of all accumulation of production factors and impose a steady state requirement to endogenise factor supplies. Under these circumstances, the policy changes also entail a change in factor endowments (accumulation and reallocation effects). An extension of this approach is to explicitly look at the accumulation paths between the two steady state equilibria (before and after a policy change) and take into account that accumulation requires consumption to be forgone (Keuschnigg and Kohler, 1997).

Welfare effects are in general modelled using the idea of overlapping generations or assuming a representative, infinitely lived household. The overlapping generations framework allows for intergenerational distributional considerations and is therefore more suitable for the welfare analysis of real world integrational processes.[7]

A Further Modification: Sunk Costs Incorporated

Recent work in the field by Mercenier and Schmitt (1996) has criticised the underlying assumptions of the IO approach, namely the assumption of costless capital and labour mobility, which tend to overestimate the efficiency and welfare gains from free trade for small economies. Previous work suggested the convenience of the use of costless entry/exit assumption. Introducing sunk costs into the framework significantly changes the conclusions drawn from the analysis. The large efficiency gains predicted by the zero-sunk-cost restriction of the Harris (1984) type of model are confronted in this work.

The incorporation of sunk costs captures some, but by no means all, the reallocation problems that arise from the existence of specificity as we explain below. The existence of sunk costs can be in general applied to both capital and labour.

In the case of capital, sunk costs, i.e. unrecoverable fixed costs, can become an exit or entry barrier. As an exit barrier, by sunk investment decisions firms commit themselves to stay in the market (and signal to potential entrants that they will do so) despite possible below-market-level returns for their specific assets.

Sunk expenditure acts as an entry barrier, since it must be born by the new entrants, while the incumbents do not incur these costs anymore. When trade liberalisation takes place, operating profits of the incumbents are squeezed and this fact makes entry less attractive. The incumbents who survive the policy change can tacitly agree to raise prices in order to recover some of the forgone rents. In contrast, in the absence of sunk costs producers expand

[6] For description see the Methodology section below.
[7] See for example Keuschnigg and Kohler (1997).

production when integration takes place, since their perceived elasticity of demand increases. Accordingly, prices fall and profits become negative. This forces some firms to exit and efficiency gains to be realised. (Mercenier and Schmitt, 1996)

In the context of the labour market, specificity arises from the existence of technological and institutional impediments to creation and destruction. For instance, workers acquire skills by learning on the job while companies invest in the human capital of their employees. Upon separation, a part of the investment on both sides of the productive relationship is lost due to the specificity of skills and the inalienability of human capital from the worker. In a world with imperfect contracting it implies not only that separation is costly, but also the specificity of relations between production factors influences creation and destruction decisions. At the macroeconomic level there is insufficient creation of new production units due to the sunk nature of investment, while destruction is excessive as long as it does not fulfil its reallocational role (Caballero and Hammour, 1998).

The relevance of the recognition of specificity in the factor markets to the transition process in former centrally planned economies is obviously important. The incorporation of sunk costs into the analysis of trade liberalisation processes can significantly influence the results, and possibly contradict those suggested within a more traditional framework with costless entry and exit.

IV. Modelling Options

AGE modelling options can be summarised as follows[8]:

Product Differentiation	Market Structure	Trade Specification
No differentiation	Perfect Competition or Cournot	Small Country or Multicountry
Differentiation by Country (Armington, 1969)	Perfect Competition or Cournot or Eastman-Stykolt	Almost Small Country or Multicountry
Differentiation by Firm (Dixit-Stiglitz, 1977)	Cournot	Multicountry

(Kehoe & Kehoe, 1994a)

[8] The table does not exhaust all the possibilities. For instance, Bertrand competition specification can be used instead of Cournot, but it is rarely found in AGE models.

The concept of product differentiation by country of origin, or the so called Armington specification (1969), has been incorporated into AGE models in order to account for observed large amounts of intra-industry trade. The intuition behind the concept is that consumers do not regard goods in the same industry category produced in different countries as identical. In a model with homogenous goods, no cross-hauling would be present.

According to the Armington specification, "domestic goods are different from foreign goods, which allows the prices of domestic goods to vary and gives even the smallest country some market power". (Kehoe & Kehoe, 1994a, p. 8) This combination of treating foreign prices and incomes as exogenous and modelling domestic and foreign goods as imperfect substitutes is the so-called *almost small-country assumption*.[9]

Market structure affects the pricing rules that prevail in a certain market. A competitive market structure under which produces are price-takers implies that price equals marginal cost. Non-competitive behaviour can be modelled in three ways. Using the Cournot competition framework, marginal cost equals price multiplied by one minus the reciprocal of the elasticity of demand faced by the firm (i.e. price exceeds marginal cost). This formula represents the degree of monopoly power according to which marginal cost equals marginal revenue. An alternative modelling option is the Eastman-Stykolt or collusive behaviour pricing rule which simply assumes that price equals the foreign price multiplied by one plus the domestic tariff. The third option is a combination of the first two. Namely the price is a weighted average of the Cournot and Eastman-Stykolt prices.

In modelling labour markets in the neoclassical setting of AGE framework there are significant obstacles to capturing wage differentials. One approach is to equalise factor returns across all sectors. The second approach is to hold wage differentials constant.[10]

Since we believe neither of these assumptions can be justified in a transition economy where reallocation takes place in response to relative price changes, we hold factor returns constant and look at the implied changes in quantities as measured by factor utilisation. Then we decompose the effects with reference to the utilisation of skilled and unskilled labour based on their relative intensities across individual sectors.[11]

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[9] The small country assumption takes foreign prices and incomes as given (exogenous), while no product differentiation is assumed in traditional trade theory.

[10] For modelling trade and labour market behaviour see Thierfelder and Shiells (1997).

[11] The unavailability of compatible disaggregate skilled and unskilled labour data also constraints the explicit modelling of these two factors in a production function.

V. Model Specification

For conducting the analysis we use a single-country static AGE model following Kehoe & Kehoe (1994a) and Mercenier (1994). We also make several modifications in order to mirror the data set more appropriately. For instance, the modifications involve the inclusion of the value-added tax (VAT), fixed costs, a distinction between "basic" prices of the produces and purchasers' price and the corresponding accounting identity. The savings category is adjusted for the net change in inventories.

The model has micro-foundations, in which a representative consumer solves a utility maximisation problem and producers maximise profits. Government policy (fiscal) is exogenous, i.e. not the result of an optimisation problem.

There are 7 goods in the economy distinguished by trading product categories using the SITC rev. 3 (1-digit) classification (SITC 0 & 1, SITC 2, SITC 3, SITC 5, SITC 6, SITC 7, SITC 8),[12] In addition we include consumption of services, non-traded goods and services, a government consumption good and an investment good (adjusted for change in inventories). Purchases of the investment good in the utility function account for savings observed in the data. These 11 categories all enter directly the utility function. Products are differentiated according to the Armington specification in all categories.

The market structure is assumed to be non-competitive for fuels and related materials (SITC 3) and for chemical products (SITC 5). There are n oligopolistic firms in each industry which are assumed to be identical.

The following table summarises the above given model specification:

Consumption Category		Product Differentiation	Market Structure
SITC 0 & 1	(c1)	Armington specification	Competitive
SITC 2	(c2)	Armington specification	Competitive
SITC 3	(c3)	Armington specification	Non-competitive
SITC 5	(c4)	Armington specification	Non-competitive
SITC 6	(c5)	Armington specification	Competitive
SITC 7	(c6)	Armington specification	Competitive
SITC 8	(c7)	Armington specification	Competitive
Services	(c8)	Armington specification	Competitive
Non-traded goods (NT)	(c9)	None	Competitive
Government consumption	(c10)	None (ass.: NT goods)	-
Investment	(c11)	None	-

[12] See Appendix for the conversion of NACE and SITC rev. 3 classifications.

For the Armington specification we distinguish among imports from the following economic and political regions: the CEFTA countries, the European Union, the Former Soviet Union (FSU) and the rest of the world (ROW). Therefore, the total number of regions inclusive of the domestic economy is five.

Lacking information on the distribution of imports from different regions into final consumption and intermediate consumption in individual categories, we use the standard assumption that the distribution is identical in proportions to that at the aggregate level.

The Consumer's Problem

Assuming a nested (two level) log-linear utility function, the maximisation problem of the representative consumer is given:

(1a) $$\max u(c_1, c_2, \ldots c_n) = \sum_{i=1}^{12} \theta_i \log(c_i)$$

(1b) $$\text{where } c_i = \{\sum_{j=1}^{5} \delta_j c_{ij}^{(1-1/\sigma)}\}^{\sigma/(\sigma-1)}$$

where c_{ij} is the consumption of good i imported from region j, σ is the elasticity of substitution and δ_j is a share parameter;

subject to

(2) $$\sum_{j=1}^{12} p_{pi} c_i \leq (1-\tau)(wL+rK) + T$$

where p_{pi} is purchasers' price of good i, τ is the direct tax rate, w and r are the wage rate and capital rental rate, L and K are consumer's endowments of labour and capital, and T is transfer payment.

Competitive Market Structure

We assume that each of the produced goods has a production function which combines intermediate inputs in fixed proportions and labour and capital with substitution possibilities according to a Cobb-Douglas production function of the form $\beta k^{\alpha} l^{1-\alpha}$. Here k and l denote sectoral factor inputs. The general from of a total production function is

(3) $$y_i = \min (x_{1i}/a_{1i}, x_{2i}/a_{2i}, \ldots\ldots, x_{hi}/a_{hi}, \beta_i k_i^{\alpha_i} l_i^{1-\alpha_i})$$

where x_{hi} is the intermediate input of good h used in the production of good i; a_{hi} is the amount of good h required to produce one unit of good i; and a_{hi}, β_i and α_i are the parameters to be calibrated.

Assuming no production waste, the production function in (3) implies that

(4) $$y_i = x_{hi}/a_{hi} = \beta_i k_i^{\alpha_i} l_i^{1-\alpha_i}$$

If not every good is used in the production of every other good, the corresponding entry is dropped from the production function, rather than adopting complicated conventions about dividing by zero.

Since (3) and (4) contain only either Cobb-Douglas or fixed proportions functions, all elasticities of substitution in consumption or production are equal to one or infinity. If additional information is available on elasticities of substitution in consumption or production, it can be incorporated in the model.

The producers' problem is given as follows:

(5) $$\min wl_i + rk_i$$

subject to (4).

For the categories with differentiated products the minimisation of costs of intermediate inputs also applies. Inputs are nested in this case similarly to final consumption:

(6) $$x_i = \{\sum_{i=1}^{5} \delta_j x_{ij}^{(1-1/\sigma)}\}^{\sigma/(\sigma-1)}$$

where σ is the elasticity of substitution and δ_j is a share parameter.

Non-Competitive Market Structure

The production function given by equation (3) represents constant returns to scale and perfect competition among producers. This mode of analysis dominated research in the 1970s as described above. Incorporating increasing returns and imperfect competition implies a production function of the following form:

(7) $$y_i = \min [x_{1i}/a_{1i}, x_{2i}/a_{2i}, ..., x_{ni}/a_{ni}, \max (\beta_i k_i^{\alpha_i} l_i^{1-\alpha_i} - f_i, 0)]$$

Here f is the fixed cost required to operate the firm.

The producers' problem is given as:

(8) $$\max p_{bi} y_i - (v_i y_i + f_i) \qquad \text{where } f_i = wl_i^f + rk_i^f \text{ and } v_i = wl_i + rk_i$$

with f_i and v_i representing fixed and variable costs respectively; and p_{pi} being the basic or producer price.

subject to

(9) $$\beta_i k_i^{\alpha_i} l_i^{1-\alpha_i} = y_i + f_i$$

Here the producers' problem is assumed to have a Cournot specification: the choice variable is output y.

Since fixed costs are assumed to consist of fixed labour and capital costs only and all intermediate inputs are treated as variable cost, the problem for intermediate inputs remains the same as in the case of competitive industries.

General Equilibrium

An equilibrium is specified by listing the values of all endogenous variables in the model: the price for each produced good p_j, a level of consumption for each good c_j, a wage rate w, a capital rental rate r, a production plan for each of the produced goods (y_j, x_{1j}, x_{2j}, …. k_j, l_j,) and a level of government tax receipts T. To be an equilibrium, such a list must satisfy the following properties:

- The consumption vector solves the utility-maximisation problem subject to the budget constraint described in equations (1a), (1b) and (2).

- The production plan (yi, x1i, x2i, ... ki, li) minimises costs or maximises profits subject to the technology constraints.

- Supply equals demand in the market for each produced good, where total demand on the right-hand side consists of sectoral domestic consumer demand cid, domestic investment demand invi, domestic intermediate demand xhid and foreign import demand fimpdi.

  (10) $$y_{id} = c_{id} + inv_i + \sum_{i=1}^{9} x_{hid} + fimpd_i$$

  for h, i = 1, 2, ..., 9 since by assumption, government consumption falls under the category of non-traded goods and this reduces the total number of production categories to nine.

- On the external accounts: foreign export supply is assumed to be perfectly elastic with respect to Slovak import demand due to the small size of the economy, i.e. the rest of the

world supplies any amount of goods demanded at fixed world prices. At the same time, total foreign import demand is given as the function of the real exchange rate:

(11) $$fimpd=M_0 (p^T/p^{NT})^{\varepsilon}, \quad -\infty<\varepsilon<0$$

where M_0 denotes base year total exports, p^T represents a price index of traded goods weighed by volume and p^{NT} stands for the non-traded goods price. The parameter ε is the foreign import demand price elasticity.

- Supply equals demand in each factor market:

(12) $$L = \sum_{i=1}^{n} l_i$$

(13) $$K = \sum_{i=1}^{n} k_i$$

Here total factor supplies L and K are net of fixed capital and labour costs which reflects the assumption of irreversibility of investment or, in other words, sunk costs.

- The transfer to the consumer equals total tax receipts (government budget constraint):

(14) $$T = \tau(wL + rK) + \sum i=110\ ti\ pi\ yi$$

where t_i is the net aggregate tax rate on good i.

- The relationship between the basic/producer price and purchasers' price is given by the following identity:

(15) $$ppi = pbi\ (1 + vati + impti + tax/subsidyi + tradmi)$$

where vat_i is the value-added tax rate, $impt_i$ denotes the ad-valorem tariff rate and $tradm_i$ stands for trade margins.

Equation (15) implies that the relationship between domestic and foreign price is as follows:

(16) $$pdi = pfi\ (1+ impti)$$

where the subscripts d and f denote domestic and foreign variables respectively.

VI. Calibration and Comparative Statics Analysis

In general, a static AGE model uses the comparative statics methodology:

1. A model with micro foundations is constructed so that its equilibrium replicates the observed data.

2. The parameters of the model are calibrated using simple functional forms (for the sake of simplicity).

3. The impact of a policy change is simulated by altering the relevant policy parameters and calculating the new equilibrium.

Calibration

In other words: We solve the model described above and use the first-order conditions (FOCs) of the optimisation problems together with the equilibrium conditions to calculate the parameters of the model.

The FOC to the consumer's problem using the one-level utility function gives the formula for calibrating θ_i:

(17) $$\theta_i = p_{pi}\, c_i \,/\, I$$

where for simplicity I denotes disposable income and equals to the right hand side of the consumer budget constraint in equation (2). The parameters θ_i, corresponding budget shares, sum to one.

The solution to the nested (two-level) utility maximisation problem yields the following FOC from which the share parameter δ_j is calibrated:

(18) $$\delta_j = p_{pij}/p_{pi}\,(c_{ij}/c_i)^{\,1/\sigma}$$

where σ is the elasticity of substitution and its value is set to equal two[13]. This assumption biases the results by implying a high flexibility in the reorientation of imports and therefore it quantitatively underestimates the effects of distortionary policies such as a PTA.

[13] See Appendix for data caveats.

Prices for the twelve consumption categories, domestic and foreign prices are calculated using the accounting identity given by equation (15) and by having the basic prices benchmarked in the initial equilibrium, and therefore, set equal to one.

On the production side, in competitive industries the parameters of the Cobb-Douglas production function are calibrated using the FOC of the optimisation problem and by benchmarking the wage-rental ratio to equal one in the initial equilibrium:

(19) $$w/r = (1-\alpha_i)\, k_i / \alpha_i\, l_i$$

which reduces to

(20) $$\alpha_i = rk_i / (rk_i + wl_i)$$

Equation (20) states that α_i is the share of return to capital in total value added.

Accordingly, the scale parameter β_i is calibrated as follows:

(21) $$\beta_i = y_i / k_i^{\alpha_i} l_i^{1-\alpha_i}$$

The CES share parameters for differentiated intermediate inputs are calibrated from the following FOC:

(22) $$\delta_j = p_{pij} / p_{pi}\, (x_{hij} / x_{hi})^{1/\sigma}$$

For non-competitive industries the calibration procedure differs from that used by Kehoe & Kehoe (1994a), since they assume that fixed and variable costs are distinguished in the data set. Lacking this information, we calibrate the fixed and variable costs by setting the value of the number of firms in non-competitive industries equal to a number that reflects the concentration in the industries in question. In the case of homogenous goods the number of firms n would coincide with the perceived elasticity of demand for individual firms which are assumed to be identical. In the non-competitive industries SITC 3 and SITC 5 with product differentiation, on the other hand, the perceived elasticity is less than n which stems from augmented market power due to differentiation.

For the case of Cournot competition with differentiated products variable costs are calibrated as follows:

(23) $$v_i = [\, 1- (n + \rho\, \delta_d - \rho n)/n \,]\, p_{pi}$$

where $\rho = 1 - 1/\sigma$, $\rho<1$, $n>1$ and δ_d is the Armington share parameter for the domestic region. In this case the elasticity of demand is $n/(n + \rho\delta_d - \rho n)$ which is less than n as long as the above given restrictions for the parameter values are satisfied.

Reproduction of the Benchmark Equilibria

In order to account for any potential discrepancies between the original data set and the model, we generate a new benchmark equilibrium for both Slovakia and Hungary by using the computational model.

In the case of Slovakia, the computational model produces satisfactory results by accounting for the simplifying assumptions of the theoretical model. Among them are no inventories, no imports of investment goods and some special events in 1993 – e.g. military imports from Russia as a write-down of outstanding Slovak claims which appear only on the imports accounts and not in fiscal accounts.

The computational model accounts for 82 percent of total imports and 93 percent of total value added. Although the discrepancies at sectoral level are higher, the model captures sectoral interaction well and can serve as a solid basis for conducting the simulation and comparing the results to this new benchmark.

The results are even more satisfactory for the Hungarian economy, since the Hungarian data set is informationally richer.[14] The reproduction deviates from the original data set by 2 percent in the case of aggregate imports and by 4 percent for total output which corresponds to accounting for 95 percent of total value added. The discrepancies at sectoral level remain low as well.

Simulation

By changing a policy parameter, such as setting import duties with respect to a trading block equal to zero, we can simulate the integration of Slovakia and Hungary into the trading arrangement. We calculate the new short run equilibrium values by using the parameter values obtained earlier and working backward with the demand equations in the above section on calibration.

In order to adjust for the recent protectionist tendencies in Slovakia we adopt a uniform import surcharge of 10 percent imposed by the Slovak government since 1993. This is a first

[14] The Hungarian data set consists of two input-output matrices: one for domestic resources and the second for imports. Therefore, in this case we do not need to make additional assumptions regarding the distribution of imports in final and intermediate consumption.

approximation for the overall level of protection, since it does not account for various administrative measures (e.g. import licensing).

We repeat the basic simulations using different levels of tariff protection varying between 0–30% with different combinations of trading partners. We adopt this methodology as an approximation of effective protection that includes non-tariff measures. Since tariff protection is not the sole, or even the primary, form of protection used by EU/EC, the use of approximate tariff equivalent measures is necessary in a model of this type. Frankel et al. (1995) estimate that the effective level of protectionism within the EC to be around 40 percent. We impose this estimate as the upper bound on our simulations given that we keep in mind that subsidies, quotas, content clauses and other administrative barriers account for effective protection that is not reflected in tariff rates.[15] Unfortunately, modern economic analysis lacks the tools to quantify the effects of disposable protection measures.[16] We are therefore bound to simulate plausible levels.

VII. The Results

In this section we evaluate the results of different scenarios of trade policy. The options include:

1. The uniform 10% import surcharge allocation compared to the computational benchmark. (Slovakia only)

2. PTA integration simulation (EU) with the surcharge allocation as base. (Slovakia only)

3. PTA integration (EU) compared to the computational benchmark, 10, 20 and 30% external protection.

4. Wider PTA integration (EU and CEFTA) compared to the computational

5. benchmark, 10, 20 and 30% external protection.

6. Multilateral liberalisation compared to the computational benchmark.

[15] For simplicity, we ignore other factors such as content requirements in the European Agreements that even in the absence of accession to the PTA lead to trade diversion. Winters (1992).

[16] As a demonstration, an OECD (1997) study estimates that the producers subsidy equivalent in the agricultural sector sums up to 43% for the EU. Of course, this measure does not include other targeted non-tariff barriers in this sector. For a preliminary attempt at quantifying such barriers see Anderson and Neary (1998).

In each case we look at the welfare implications for consumers, output expansion or contraction by sectors, import substitution at aggregate level and the new geographical distribution of imports as well as the degree of labour and capital utilisation.

The change in consumer welfare can be calculated using the equivalent variation measure. By definition, the equivalent variation is "the amount of money which would have to be given to the consumer when he faces the initial price to make him as well off as he would be facing the new price". (Gravelle & Rees, 1992, p. 118) It states how much income the consumer would need, when faced with the original prices, to achieve the same level of utility as in the simulation. In the form of a ratio this measure can be expressed as:

(24) $$EV = m(p^0, u^1) / m(p^1, u^1)$$

where m( ) is the expenditure function, p^0 is the original price vector, p^1 is the new price vector under the simulation and u^1 is the level of utility attained under the simulation. Consequently, a number greater than one indicates a welfare gain and vice versa.

Alternatively, the compensating variation measure uses the initial utility level as the base.

Summary of the Results for Slovakia

Consumer welfare increases under scenarios (2) and (5) and decreases under the remaining scenarios which explicitly account for protectionist measures. Specifically, scenarios (3) and (4) demonstrate that joining a PTA does not compensate for the external protection when compared to the computational benchmark with the relatively low tariff levels of 1993.

Total output expands under increased protection and aggregate imports decline. More interestingly, the results of scenario (2) suggest that as total output contracts under PTA, labour utilisation decreases relatively more than that of capital. This implies that relatively labour intensive industries are likely to contract, while the level of output in capital intensive industries remains the same.[17] The contracting sectors include SITC0&1, SITC5, SITC7, SITC8 and services. The projected expansion in SITC3 only reflects trade diversion due to the large base of fuel imports from the FCP economies. Consequently, the aggregate output level is overestimated.

In terms of labour market considerations the contraction of the above mentioned sectors translates into relatively more contraction on the side of skilled labour. This is due to the fact that SITC5, SITC7 and services belong to the product categories with high skilled labour employment and their weight in total output is also highly significant.

[17] This result is confirmed by directly looking at the calibrated alfa coefficients at individual industries.

Multilateral liberalisation projects a moderate contraction of aggregate output, while the list of contracting industries reduces to SITC0&1, SITC2 and services. Labour and capital utilisation remain more balanced in this case. The implications for skilled labour employment are thus more favourable under this scenario, since SITC0&1 and SITC2 rank lower in skilled labour employment.

This result is the most robust and significant part of the analysis. In all scenarios, excluding multilateral liberalisation, emergence of structural distortions is apparent. Logically, these distortions are less acute under scenario (4) with a wider and more diverse PTA.

The Case of Hungary

The most remarkable difference between the Slovak and the Hungarian simulation results

is in relative factor utilisation. The Hungarian simulations do not exhibit the large asymmetry in capital and labour utilisation, although labour utilisation remains slightly more sensitive than capital in this case as well.

The simulation results suggest that the least competitive sectors of the economy both with respect to the EU and the combined EU-CEFTA block are SITC5, SITC6 and SITC8. The losses in terms of factor employment are larger when exposed to CEFTA competition. In this case unskilled labour loses relatively more, since only SITC5 is characterised by high skilled labour utilisation.

Trade diversion is likely to become an important factor only at higher levels of external protection, since output and factor utilisation first decrease and then rise relative to the benchmark along with the rate of external protection.

In general, the responsiveness of output and imports to the trade policy changes is smaller in the case of Hungary. This reflects the fact that the EU is a relatively more significant trading partner for Hungary. At sectoral level, the Slovak economy is more concentrated in industries with large input requirements of fuels and raw materials from the FCP region. Thus, the scope for trade diversion under the PTA is more significant for Slovakia.

The Results and the Institutional Background

We can gain further understanding of the underlying determinants of the obtained results by investigating the institutional environment of the EU enlargement process. By looking at the Europe Agreements several studies have identified an array of non-tariff protectionist measures which can provide a rationale for the distortionary effects of joining the EU as implied by our model. (See for example Faucompret et al. (1998) or CEPR (1992).) These measures include,

for instance, content clauses, antidumping duties and the harmonisation of technical standards.

Content clauses. The abolishment of tariffs and quotas under the Europe Agreements only applies to products originating in the Partner Country or in the rest of the Visegrad countries participating in the Agreements. This condition implies that the products must be wholly manufactured in the Partner Country or must have undergone sufficient working or processing in the country reaching the minimum content level of 60 percent.

Consequently, given that Slovakia has extensive trade links on the input side with the countries of the FSU, the minimum content requirement leads to trade diversion as the origins of inputs need to be reconfigured to comply with the content requirements. Trade diversion is likely to increase the costs of inputs and harm the competitiveness of the products. The fact that the Visegrad countries have similar industrial structures does not help alleviate the trade diverting effect of content clauses.

Antidumping measures. In antidumping investigations the calculation of the "normal value" is based on the actual prices in the CEEC concerned for the alleged dumping and not on the normal value for the goods in an analogue country.

This means that CEEC companies are forced to export at a minimum price that would preclude the imposition of antidumping duties. As most of the antidumping cases against CEECs have been in the chemical and steel sectors, the use of this very flexible and targeted protectionist tool seems to be correlated with the sectors in which the CEECs are likely to have a comparative advantage. (Faucompret et al., 1998)

Harmonisation of technical standards. The Europe Agreements require the CEECs to commit themselves to make their legislation compatible with EU specifications and standards. This requirement serves as another loophole in the liberalisation process with respect to the CEECs, since it effectively acts like a non-tariff barrier.

The harmonisation requirement protects the domestic EU market by increasing the costs to outside producers and by preventing EU firms from relocating their plants to the countries with lower protection levels. This implies an inhibiting effect on FDI flows.

In summary, the non-tariff protectionist measures embodied in the Europe Agreements are in congruence with the modelled levels of effective EU external trade barriers. The discriminatory nature of the PTA can lead to trade diversion and distortionary reallocation pressure the extent of which is context dependent.

VIII. Conclusion

The computational general equilibrium analysis has shown that protectionism – whether uniform or preferential – unambiguously reduces consumer welfare, while the framework of a preferential trade agreement creates scope for trade diversion as well. Trade diversion in turn can lead to an inferior allocation of resources. Specifically, reallocation and utilisation of the existing physical and human capacities are less distortionary under a non-discriminatory trade regime. The efficiency losses are augmented in the presence of specificity in factor relations in the affected industries. At the macroeconomic level this problem translates into insufficient creation due to the specific nature of investment and excessive destruction to the extent that it does not fulfil its reallocational role. Thus the costs in terms of labour underutilisation are higher than those suggested by a more orthodox theoretical framework.

In the case of Slovakia the simulation of joining the preferential trading arrangements of the EU projects contraction in the relatively labour intensive sectors and overall output decline. Skilled labour emerges as a loser under this arrangement. On the other hand, the simulation of a multilateral liberalisation indicates only moderate aggregate output contraction confined to the agricultural and service sectors and extraction of crude minerals. Indeed, Slovakia is not likely to possess a comparative advantage in these industries. The utilisation of labour and capital remains high in the rest of the production categories, and thus skilled labour is not adversely affected in this case.

The above given results are consistent with the hypothesis of different short-term reallocational tendencies described by Brunner. The sectors projected to expand under the PTA are precisely those with low levels of value added such as fuels and crude materials. On the other hand, the traditional export sectors contract under the PTA. These include chemicals, machinery and transportation equipment, and other manufacturing products. The objective of efficient utilisation of existing physical and human capacities is more favourably obtained under a multilateral liberalisation process than under accession to a preferential arrangement. These results hold despite the assumption of high elasticity of substitution between imports and domestic products and conducting the analysis with a large and well-diversified PTA. Both factors introduce a downward bias regarding the distortionary effects of the PTA.

As the results are context dependent, the analysis has different implications for the Hungarian economy to the extent that it is less dependent on the input side on resources from the former Soviet Union and the EU is the dominant trading partner. Consequently, the scope for trade diversion is lower and so are reallocational pressures. The responsiveness of output, input demand and factor utilisation to different trade policy choices is less pronounced. The simulation reveals that both the EU and the CEFTA countries are likely to be significant competitors for Hungary in chemicals, intermediate manufactured products and other light industry manufacturing products. This in turn implies that apart from the chemical industry,

unskilled labour is likely to lose relatively more upon accession to the PTA. However, relative capital and labour utilisation remain balanced.

The use of the general equilibrium framework has provided a nuanced picture of the Hungarian and the Slovak economies. Although we have focused on the labour markets, especially on the asymmetry of the effects of economic integration on skilled and unskilled labour, and the relative capital and labour utilisation, the methodology can be applied to a broader set of questions. The analysis has shown that the methodolgy can provide useful guidance for policy makers when the theoretical predictions themselves are ambiguous and case dependent.

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Appendix I:

The Data

The Slovak Data Set

The core of the data set necessary for conducting the AGE analysis for Slovakia is given in the *Supply and Use Tables for the Slovak Republic by Commodities and Industries for the Year 1993,* which is a publication issued by the Slovak Statistical Office. (Code No. 041196, Date of Issue: December 1996.)

The tables contain the following information:
Classification of economic activities (NACE)
Classification of production (CPA)
Supply table
Use table – intermediate consumption and value added
Use table – final use
Transformation of supply table from basic to purchasers' prices
Balanced supply and use tables and GDP table
Input coefficients for intermediate consumption and value added
Distribution coefficient table for intermediate consumption and final use

The unit of account is one thousand Slovak crowns (Sk) and all the presented tables use the same scale.

Aggregate level data are comprised in the *Macroeconomic Indicators of Quarterly National Accounts for 1990–95 and Yearly National Accounts for 1985–1992* (Code No. 040296), issued in April 1996. The geographical pattern of trade is extracted from the ezosr4#9.exe (1991–94 data) electronic application prepared by the Slovak Statistical Office.

The Hungarian Data

The input-output table for Hungary was compiled by the Hungarian Statistical Office for 1994. The format of the table is of type “B”, which separates the imported goods from the total domestic resources and accounts for their use in a different matrix. The table uses the NACE classification with 21 sectors in total. The unit of account is one million Hungarian forints (Ft).

Data on skilled and unskilled labour employment, concentration ratios and geographical pattern of trade are compiled from the Statistical Yearbook of Hungary for 1994 and 1997, since some information has become available only after 1994.

Some Data Caveats

The input-output tables use the NACE classification of economic activities while the commodity classification used for foreign trade data is SITC rev. 3, one-digit industries. These two classifications overlap in certain categories and a finer disaggregation of NACE categories would be needed to make them perfectly compatible. However, such a disaggregation is not available.

Although the original Slovak data are more disaggregate than the Hungarian ones, data from several NACE categories are compiled as a single entry in the tables, since the concentration of these industries is high and the data would reveal substantial information about individual producers in the relevant industries. Also, no information on concentration ratios in individual industries is available to the public. (Source: Slovak Statistical Office.)

Econometric estimates on substitution elasticities between domestic and imported products and between imports from different countries are unavailable. Consequently, following Harrison et al. (1991, p. 100) we assume that the relevant substitution elasticities are “relatively high” and assign them a value of two.

Appendix II

Classification Scheme of the SITC rev.3:

SITC 0 – Food and live animals

SITC 1 – Beverages and tobacco

SITC 2 – Crude materials

SITC 3 – Fuels and related products

SITC 4 – Animal and plant oils, fats and waxes

SITC 5 – Chemicals and related products

SITC 6 – Intermediate manufactured products

SITC 7 – Machinery and transport equipment

SITC 8 – Miscellaneous manufactured articles

SITC 9 – Other commodities and products of trade

APPENDIX III

Conversion of Commodity Groups between SITC rev. 3 and NACE Classifications

SITC rev. 3 (2-digit)	NACE
00 Live Animals 01 Meat and meat preparations 02 Dairy products and eggs 03 Fish, crustaceans and molluscs 04 Cereals and cereal preparations 05 Vegetables and fruits 06 Sugar, sugar preparations and honey 07 Coffee, tea, cocoa, spices and their products 08 Feeding products for animals 09 Miscellaneous edible products **0 Food and live animals** 11 Beverages 12 Tobacco and tobacco manufactures **1 Beverages and tobacco**	01 Products of agriculture, hunting, etc. 02+05 Products of forestry, fish 15+16 Food products, beverages and tobacco
21 Hides, skins and furskins, raw 22 Oil seeds and oleaginous fruits 23 Natural rubber (incl. synthetic and reclaimed) 24 Cork and wood 25 Pulp and waste paper 26 Textile fibres and their wastes 27 Crude fertilisers and crude minerals (excl. coal, petroleum) 28 Metallifeous ores and metal scrap 29 Crude animal and vegetable materials, n.e.s. **2 Crude materials, inedible, except fuels**	14 Other mining and quarrying products 20 Wood, cork 21 Pulp, paper and paper products 37 Recovered secondary raw materials
32 Coal, coks and briquettes 33 Petroleum, petroleum and related products 34 Gas, natural and manufacture 35 Electric current **3 Mineral fuels, lubricants and related materials**	10 Coal and lignite, peat 11+12+13 Crude petroleum, natural gas, uranium, metal ores
41 Animal oils and fats 42 Fixed vegetable fats and oils, crude, refined 43 Fats and oils processed, waxes **4 Animal and plant oils, fats, waxes**	No equivalent
51 Organic chemicals 52 Inorganic chemicals 53 Dyeing, tanning and colouring materials 54 Medical and pharmaceutic products 55 Essential oils, resinoids and perfume materials 56 Fertilisers 57 Plastics in primary forms 58 Plastics in non-primary forms 59 Chemicals and related products, n.e.s. **5 Chemicals and related products**	23+24 Coks, refined petroleum products, nuclear fuel, chemicals and related products 25 Rubber and plastic products
61 Leather, leather manufactures, n.e.s. 62 Rubber manufactures, n.e.s. 63 Cork and wood manufactures (excl. furniture) 64 Paper, paperboard and articles thereof 65 Textile yarn, fabrics, and products, n.e.s. 66 Floor coverings, etc. 67 Iron and steel 68 Non-ferrous metals 69 Manufactures of metals **6 Intermediate manufactured products**	17 Textiles 19 Leather and leather products 26 Other non-metallic mineral products 27 Basic metals 28 Fabricated metal products except machinery and equipment

71 Power generating machinery and equipment 72 Machinery specialised for particular industries 73 Metal-processing machinery 74 General industrial machinery 75 Office and automatic data processing machines 76 Telecommunications and sound recording equipment 77 Electrical machinery, apparatus and appliances 78 Road vehicles 79 Other transportation equipment **7 Machinery and transportation equipment**	29 Machinery and equipment, n.e.s. 30+31 Office machinery, computers, electrical machinery and apparatus, radio, television, telecommunication equipment 32 Radio, television, telecommunication equipment 34 Motor vehicles, trailers 35 Other transportation equipment
81 Prefabricated buildings; sanitary etc. fixtures, n.e.s 82 Furniture and parts 83 Travel goods, handbags and similar containers 84 Articles of apparel and clothing accessories 85 Footwear 87 Professional, scientific and controlling instruments 88 Photographic apparatus, equipment, optical goods, clocks 89 Miscellaneous manufactured articles, n.e.s. **8 Miscellaneous manufactured articles**	18 Wearing apparel, furs 22 Printed matter and recorded media 33 Medical, precision and optical instruments, watches and clocks 36 Furniture
9 Other commodities and products of trade	
Services	45 Construction work 51 Wholesale trade (except motor vehicles) 50+52 Retail trade, repair services 60 Land transport and transport via pipelines 61+62+63 Water, air and other transportation services 64 Post and telecommunication services 65 Financial intermediation (except insurance and pension funding) 66 In insurance and pension funding services 71 Rental services of machinery and equipment 72 Computer and related services 73 Research and development services 74 Other business services
Non-traded goods and services	40 Electrical energy, gas, steam, hot water 41 Water distribution services 55 Hotel and restaurant services 67 Services auxiliary to financial intermediation 70 Real estate services 75 Public administration and defence services 80 Education services 85 Health and social work services 90 Sewage and refuse disposal services 91+92 NGO services, recreational, cultural and sporting services 93 Other services 95 Private households with employed persons

CALIBRATION AND REPRODUCTION OF THE BENCHMARK EQUILIBRIUM - HUNGARY

Parameters (calibrated or exog.)

Elast. of su: 2 rho=1-1/sigma 0,5

Fcon 2nd le	CEFTA	EU	FCP	ROW	Domestic
SITC0+1 (c	0,0563	0,1897	0,0160	0,2096	0,9574
SITC2 (c2)	0,0324	0,0443	0,0290	0,0385	0,9973
SITC3 (c3)	0,0792	0,0676	0,1651	0,0603	0,9789
SITC5 (c4)	0,1765	0,5200	0,1238	0,3469	0,7502
SITC6 (c5)	0,1971	0,5187	0,1662	0,2596	0,7727
SITC7 (c6)	0,1370	0,6930	0,1747	0,4433	0,5234
SITC8 (c7)	0,0917	0,5256	0,1213	0,3177	0,7744
SERVICES	0,0225	0,0225	0,0225	0,0225	0,9990

Icon 2nd le	CEFTA	EU	FCP	ROW	Domestic
SITC0+1 (c	0,0677	0,2281	0,0192	0,2520	0,9378
SITC2 (c2)	0,1649	0,2253	0,1477	0,1959	0,9284
SITC3 (c3)	0,2242	0,1914	0,4673	0,1707	0,8159
SITC5 (c4)	0,1784	0,5255	0,1252	0,3506	0,7440
SITC6 (c5)	0,2059	0,5419	0,1736	0,2712	0,7485
SITC7 (c6)	0,1357	0,6863	0,1730	0,4390	0,5365
SITC8 (c7)	0,0837	0,4794	0,1106	0,2898	0,8167
SERVICES	0,1882	0,1882	0,1882	0,1882	0,9265

Cons. expend. share (theta)

c1	0,1212
c2	0,0004
c3	0,0289
c4	0,0337
c5	0,0030
c6	0,0315
c7	0,0418
c8	0,1414
c9	0,2540
c10	0,1250
c11	0,2192
	1,0000

Compet. ind. K share (alfa)

c1	c2	c5	c6	c7	c8	c9
0,5192	0,2348	0,2575	0,3387	0,3411	0,4690	0,4129

Compet. ind. scale p. (beta)

c1	c2	c5	c6	c7	c8	c9
6,5775	3,3057	6,5203	5,1805	4,5618	3,8123	3,0267

Comp. ind.input coeff.(icoef)

0 c1	c2	c5	c6	c7	c8	c9
SITC0+1 (c	0,4035	0,0217	0,0055	0,0029	0,0210	0,0174	0,0164
SITC2 (c2)	0,0004	0,0697	0,0004	0,0004	0,0077	0,0017	0,0003
SITC3 (c3)	0,0298	0,0431	0,1136	0,0313	0,0346	0,0370	0,0236
SITC5 (c4)	0,0589	0,0530	0,0781	0,0500	0,0650	0,0312	0,0246
SITC6 (c5)	0,0146	0,0127	0,2740	0,0937	0,0143	0,0184	0,0079
SITC7 (c6)	0,0186	0,0275	0,0363	0,2400	0,0168	0,0307	0,0197
SITC8 (c7)	0,0214	0,0197	0,0108	0,0184	0,2194	0,0216	0,0347
SERVICES	0,0970	0,1136	0,1322	0,1052	0,1197	0,1854	0,0946
NONTRAD	0,0297	0,0475	0,0479	0,0583	0,0544	0,1062	0,1093

Exogenou Base Year New

World price of imports wpmn

SITC0+1 (c	1,0000	1,0000
SITC2 (c2)	1,0000	1,0000
SITC3 (c3)	1,0000	1,0000
SITC5 (c4)	1,0000	1,0000
SITC6 (c5)	1,0000	1,0000
SITC7 (c6)	1,0000	1,0000
SITC8 (c7)	1,0000	1,0000
SERVICES	1,0000	1,0000

(normalised and adjusted for import subsidies

Import tariffs (rimpt)

SITC0+1 (c	0,1305	0,1305
SITC2 (c2)	0,2495	0,2495
SITC3 (c3)	0,0342	0,0342
SITC5 (c4)	0,0665	0,0665
SITC6 (c5)	0,0688	0,0688
SITC7 (c6)	0,0295	0,0295
SITC8 (c7)	0,0696	0,0696
SERVICES	0,2630	0,2630

Dom. excise tax (rdomt)

SITC0+1 (c	0,0000	0,0000
SITC2 (c2)	0,0000	0,0000
SITC3 (c3)	0,0000	0,0000
SITC5 (c4)	0,0000	0,0000
SITC6 (c5)	0,0000	0,0000
SITC7 (c6)	0,0000	0,0000
SITC8 (c7)	0,0000	0,0000
SERVICES	0,0000	0,0000
NONTRAD	0,0000	0,0000

Savings ra	0,219245	0,219245
Govt. cons	0,124964	0,124964

Non-competitive ind. firm number (n)

# of firms S	4	4
# of firms S	13	13

Non-competitive ind. Calibration

Costs	var (vc)	fixed (fc)	fixed L(flc)
SITC3 (c3)	0,4012	4.691	0
SITC5 (c4)	0,1066	161,223	46.228

Noncomp. ind.input coeff.(icoefnc)

	c3	c4
SITC0+1 (c	0,0043	0,0122
SITC2 (c2)	0,0005	0,0001
SITC3 (c3)	0,2764	0,2563
SITC5 (c4)	0,1231	0,3294
SITC6 (c5)	0,0242	0,0199
SITC7 (c6)	0,0451	0,0281
SITC8 (c7)	0,0154	0,0407
SERVICES	0,0667	0,1078
NONTRAD	0,0426	0,0545

Base Year New

VAT tax (rvat)

SITC0+1 (c	0,0146	0,0146
SITC2 (c2)	0,0870	0,0870
SITC3 (c3)	0,0077	0,0077
SITC5 (c4)	0,0027	0,0027
SITC6 (c5)	0,0034	0,0034
SITC7 (c6)	0,0022	0,0022
SITC8 (c7)	0,0039	0,0039
SERVICES	0,0137	0,0137
NONTRAD	0,0149	0,0149

Dom. production subsidy (rdoms)

SITC0+1 (c	0,0011	0,0011
SITC2 (c2)	0,0008	0,0008
SITC3 (c3)	0,0002	0,0002
SITC5 (c4)	0,0000	0,0000
SITC6 (c5)	0,0001	0,0001
SITC7 (c6)	0,0001	0,0001
SITC8 (c7)	0,0001	0,0001
SERVICES	0,0004	0,0004
NONTRAD	0,0000	0,0000

Trade and transport margins (rtm)

SITC0+1 (c	0,0000	0,0000
SITC2 (c2)	0,0000	0,0000
SITC3 (c3)	0,0000	0,0000
SITC5 (c4)	0,0000	0,0000
SITC6 (c5)	0,0000	0,0000
SITC7 (c6)	0,0000	0,0000
SITC8 (c7)	0,0000	0,0000
SERVICES	0,0000	0,0000
NONTRAD	0,0000	0,0000

	alfanc	betanc	
SITC3 (c3)	0,2956	4,9125	
SITC5 (c4)	0	18,2437	

Foreign imp. D price el -1,8130

Base export 1.100.000

Endogenous variables

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	498.555	499.179	1,00
SITC2	1.546	1.547	1,00
SITC3	120.623	120.667	1,00
SITC5	137.773	137.955	1,00
SITC6	12.391	12.407	1,00
SITC7	129.899	129.956	1,00
SITC8	171.033	171.272	1,00
Services	587.773	588.023	1,00
Nontraded	1.055.532	1.055.826	1,00
Gov't cons	519.380	519.525	1,00
Savings(K	924.801	925.073	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0253	1,0243	1,00
SITC2	1,0889	1,0887	1,00
SITC3	1,0093	1,0092	1,00
SITC5	1,0307	1,0297	1,00
SITC6	1,0301	1,0290	1,00
SITC7	1,0234	1,0233	1,00
SITC8	1,0308	1,0296	1,00
Services	1,0146	1,0144	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K	1,0000	1,0000	1,00

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,05	0,91	0,00	0,04	0,00	0,04	0,92
SITC2	0,02	0,04	0,02	0,03	0,90	0,02	0,03	0,01	0,02	0,92
SITC3	0,04	0,03	0,18	0,02	0,73	0,04	0,03	0,17	0,02	0,73
SITC5	0,03	0,27	0,02	0,12	0,57	0,03	0,26	0,01	0,11	0,59
SITC6	0,04	0,28	0,03	0,07	0,58	0,04	0,27	0,03	0,07	0,59
SITC7	0,02	0,47	0,03	0,19	0,29	0,02	0,47	0,03	0,19	0,30
SITC8	0,01	0,24	0,01	0,09	0,66	0,01	0,23	0,01	0,08	0,67
Services	0,02	0,02	0,02	0,02	0,93	0,01	0,01	0,01	0,01	0,94

NT price (p	1,0149	1,0149	1,00
T pr. Index	1,0101	1,0209	1,01
Real exch.	1,0047	0,9941	0,99
Total Imp.	1.339.837	1.362.497	1,02
Total Exp.(	1.109.402	1.088.236	0,98

	Export sha	Exports	Imports (ne	Imports (ba	New/base
SITC0&1	0,23	246.974	93.597	95.937	0,98
SITC2	0,01	9.099	927	928	1,00
SITC3	0,02	23.891	164.826	152.102	1,08
SITC5	0,16	174.676	270.455	246.970	1,10
SITC6	0,10	113.674	94.659	99.033	0,96
SITC7	0,21	226.720	304.374	498.061	1,00
SITC8	0,10	111.430	151.325	153.246	0,99
SERVICES	0,13	142.598	84.640	93.559	0,90

Equations

	Base Year	New
Utility	5,7713	5,7715
Hous exp.	4.218.108	4.219.348
Income (M	4.218.108	4.219.348

Constraints on nested utility

SITC0+1	498.189	499.179	1,00
SITC2	1.546	1.547	1,00
SITC3	120.657	120.667	1,00
SITC5	137.678	137.955	1,00
SITC6	12.381	12.407	1,00
SITC7	129.912	129.956	1,00
SITC8	170.910	171.272	1,00
Services	587.923	588.023	1,00

Total value added	3.728.423
Remittances	0
Tax transfers	207.816
Short-term external de	283.109
Total Income	4.219.348

Trade Balance: -274.262

Labor Employment: -99.506

Capital Utilization: -91.504

Final import demand

New	CEFTA	EU	FCP	ROW	Final dema domestic	Total Imports (fcimpn)
SITC0+1	1.266	14.373	102	17.543	465.400	33.283
SITC2	1	2	1	2	1.541	5
SITC3	710	517	3.086	412	115.937	4.725
SITC5	3.986	34.595	1.962	15.395	81.878	55.939
SITC6	444	3.075	316	770	7.789	4.605
SITC7	2.401	61.393	3.902	25.123	37.116	92.819
SITC8	1.326	43.520	2.317	15.902	108.026	63.065
Services	188	188	188	188	587.223	750
			Total		########	########

	Output (Yn)	L dem (ln)	K dem (kn)	Output den	Output (ba	New/Base
SITC0+1	1.321.354	193.026	208.457	1.321.354	1.348.047	0,98
SITC2	23.667	9.449	2.899	23.667	23.508	1,01
SITC3	498.538	132.413	55.574	498.538	479.773	1,04
SITC5	569.714	40.065	0	569.714	543.346	1,05
SITC6	269.515	54.293	18.825	269.515	272.096	0,99
SITC7	488.111	118.184	60.537	488.111	501.059	0,97
SITC8	438.311	120.274	62.273	438.311	434.043	1,01
Services	1.936.280	538.311	475.551	1.936.280	2.261.672	0,86
Nontraded	2.262.422	864.375	608.004	2.262.422	2.247.502	1,01
Total Supp	7.807.912	2.070.390	1.492.120	7.807.912	8.111.046	0,96

Interm. import demand (ariimpdn)

New	CEFTA	EU	FCP	ROW	Interm. der domestic	Total Impo (artiimpn)
SITC0+1	2.293	26.045	184	31.791	559.551	60.313
SITC2	181	339	145	256	8.675	921
SITC3	24.060	17.535	104.554	13.952	340.574	160.101
SITC5	15.286	132.668	7.525	59.037	302.330	214.517
SITC6	8.684	60.132	6.173	15.065	130.966	90.054
SITC7	5.472	139.929	8.894	57.261	90.615	211.556
SITC8	1.856	60.907	3.243	22.255	202.082	88.259
Services	20.972	20.972	20.972	20.972	805.818	83.890

Intermediate demand

New	SITC0+1	SITC2	SITC3	SITC5	SITC6	SITC7	SITC8	SERVICE	NT	Tot. int. der
SITC0+1	533.123	514	2.136	6.947	1.484	1.426	9.203	33.701	36.994	625.528
SITC2	478	1.649	245	72	115	206	3.364	3.225	696	10.049
SITC3	39.340	1.020	137.773	145.999	30.619	15.293	15.168	71.675	53.423	510.309
SITC5	77.827	1.255	61.354	187.666	21.048	24.414	28.480	60.327	55.611	517.981
SITC6	19.266	301	12.061	11.338	73.841	45.730	6.288	35.666	17.828	222.318
SITC7	24.585	650	22.462	15.995	9.787	117.151	7.367	59.513	44.466	301.976
SITC8	28.336	465	7.665	23.174	2.915	9.005	96.183	41.878	78.472	288.094
Services	128.201	2.689	33.229	61.435	35.628	51.364	52.480	359.046	214.088	938.159
Nontraded	39.185	1.125	21.244	31.036	12.911	28.452	23.863	205.557	247.364	610.737
Total	890.340	9.668	298.168	483.661	188.347	293.041	242.395	870.589	748.942	4.025.152

EU INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	497.615	1,00
SITC2	1.547	1.537	0,99
SITC3	120.667	119.859	0,99
SITC5	137.955	139.316	1,01
SITC6	12.407	12.533	1,01
SITC7	129.956	130.875	1,01
SITC8	171.272	173.125	1,01
Services	588.023	584.049	0,99
Nontraded	1.055.826	1.048.604	0,99
Gov't cons	519.525	515.972	0,99
Savings(K)	925.073	918.745	0,99

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0205	1,00
SITC2	1,0887	1,0884	1,00
SITC3	1,0092	1,0091	1,00
SITC5	1,0297	1,0127	0,98
SITC6	1,0290	1,0117	0,98
SITC7	1,0233	1,0092	0,99
SITC8	1,0296	1,0116	0,98
Services	1,0144	1,0144	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0142	0,99
Real exch. r (rer)	0,9941	1,0007	1,01

Total Imp. (timp)	1.362.497	1.407.882	1,03
Total Exp.(texp)	1.088.236	1.101.449	1,01

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.310.132	0,99
SITC2	23.667	23.622	1,00
SITC3	498.538	492.839	0,99
SITC5	569.714	555.360	0,97
SITC6	269.515	264.643	0,98
SITC7	488.111	484.548	0,99
SITC8	438.311	427.076	0,97
Services	1.936.280	1.923.333	0,99
Nontraded	2.262.422	2.249.475	0,99
	7.807.912	7.731.026	0,99

Utility	5,7715	5,7695	1,0022
Hous exp.	4.219.348	4.190.488	
Income (M)	4.219.348	4.190.488	1,0023

Compensating variation: gain

Equivalent variation: gain

Total VAD	3.728.423	3.699.563
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.190.488

Trade Balance condition		
-274.262	-306.434	1,12

Labor Employ	Labor mkt. Clearing	
-99.506	-116.923	1,18

Capital utilizat	Capital mkt. Clearing	
-91.504	-102.947	1,13

	Imports (base)	New	New/Base
SITC0&1	93.597	103.188	1,10
SITC2	927	1.086	1,17
SITC3	164.826	163.644	0,99
SITC5	270.455	280.808	1,04
SITC6	94.659	99.025	1,05
SITC7	304.374	306.441	1,01
SITC8	151.325	159.897	1,06
SERVICES	84.640	96.098	1,14

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,04	0,91
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,05	0,01	0,02	0,90
SITC3	0,04	0,03	0,17	0,02	0,73	0,04	0,03	0,17	0,02	0,73
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,28	0,01	0,11	0,57
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,30	0,03	0,07	0,57
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,48	0,03	0,19	0,29
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,25	0,01	0,08	0,65
Services	0,01	0,01	0,01	0,01	0,94	0,01	0,02	0,01	0,01	0,93

EU INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (10%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	498.655	1,00
SITC2	1.547	1.544	1,00
SITC3	120.667	120.077	1,00
SITC5	137.955	138.386	1,00
SITC6	12.407	12.479	1,01
SITC7	129.956	128.984	0,99
SITC8	171.272	172.499	1,01
Services	588.023	586.662	1,00
Nontraded	1.055.826	1.053.343	1,00
Gov't cons	519.525	518.303	1,00
Savings(K)	925.073	922.897	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0230	1,00
SITC2	1,0887	1,0885	1,00
SITC3	1,0092	1,0118	1,00
SITC5	1,0297	1,0241	0,99
SITC6	1,0290	1,0206	0,99
SITC7	1,0233	1,0286	1,01
SITC8	1,0296	1,0199	0,99
Services	1,0144	1,0144	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0194	1,00
Real exch. r (rer)	0,9941	0,9956	1,00

Total Imp. (timp)	1.362.497	1.349.786	0,99
Total Exp.(texp)	1.088.236	1.091.218	1,00

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.316.801	1,00
SITC2	23.667	23.621	1,00
SITC3	498.538	498.935	1,00
SITC5	569.714	564.680	0,99
SITC6	269.515	267.007	0,99
SITC7	488.111	488.857	1,00
SITC8	438.311	432.187	0,99
Services	1.936.280	1.931.463	1,00
Nontraded	2.262.422	2.257.955	1,00
	7.807.912	7.781.506	1,00

			Compensating variation:
Utility	5,7715	5,7708	1,0005 gain
Hous exp.	4.219.348	4.209.427	Equivalent variation:
Income (M)	4.219.348	4.209.427	1,0005 gain

Total VAD	3.728.423	3.718.502
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109

Total Income	4.219.348	4.209.427

Trade Balance condition			
-274.262	-258.568	0,94

Labor Employ	Labor mkt. Clearing	
-99.506	-105.412	1,06

Capital utilizat	Capital mkt. Clearing	
-91.504	-95.521	1,04

	Imports (base)	New	New/Base
SITC0&1	93.597	95.959	1,03
SITC2	927	1.015	1,10
SITC3	164.826	141.633	0,86
SITC5	270.455	272.517	1,01
SITC6	94.659	96.506	1,02
SITC7	304.374	301.083	0,99
SITC8	151.325	155.532	1,03
SERVICES	84.640	87.844	1,04

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,04	0,91
SITC2	0,02	0,03	0,01	0,02	0,92	0,01	0,05	0,01	0,02	0,91
SITC3	0,04	0,03	0,17	0,02	0,73	0,03	0,03	0,15	0,02	0,76
SITC5	0,03	0,26	0,01	0,11	0,59	0,02	0,29	0,01	0,09	0,58
SITC6	0,04	0,27	0,03	0,07	0,59	0,03	0,30	0,02	0,06	0,58
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,50	0,02	0,16	0,30
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,25	0,01	0,07	0,66
Services	0,01	0,01	0,01	0,01	0,94	0,01	0,02	0,01	0,01	0,94

EU INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (20%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	499.479	1,00
SITC2	1.547	1.549	1,00
SITC3	120.667	120.254	1,00
SITC5	137.955	137.742	1,00
SITC6	12.407	12.443	1,00
SITC7	129.956	127.632	0,98
SITC8	171.272	172.085	1,00
Services	588.023	588.608	1,00
Nontraded	1.055.826	1.056.872	1,00
Gov't cons	519.525	520.039	1,00
Savings(K)	925.073	925.989	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0247	1,00
SITC2	1,0887	1,0886	1,00
SITC3	1,0092	1,0137	1,00
SITC5	1,0297	1,0323	1,00
SITC6	1,0290	1,0270	1,00
SITC7	1,0233	1,0430	1,02
SITC8	1,0296	1,0258	1,00
Services	1,0144	1,0144	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0232	1,00
Real exch. r (rer)	0,9941	0,9919	1,00

Total Imp. (timp)	1.362.497	1.301.332	0,96
Total Exp.(texp)	1.088.236	1.083.939	1,00

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.321.667	1,00
SITC2	23.667	23.623	1,00
SITC3	498.538	503.388	1,01
SITC5	569.714	571.635	1,00
SITC6	269.515	268.775	1,00
SITC7	488.111	492.206	1,01
SITC8	438.311	435.944	0,99
Services	1.936.280	1.937.560	1,00
Nontraded	2.262.422	2.264.274	1,00
	7.807.912	7.819.072	1,00

Utility	5,7715	5,7717	0,9993
Hous exp.	4.219.348	4.223.526	
Income (M)	4.219.348	4.223.526	0,9993

Compensating variation: loss

Equivalent variation: loss

Total VAD	3.728.423	3.732.601
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.223.526

Trade Balance condition		
-274.262	-217.393	0,79

Labor Employ	Labor mkt. Clearing	
-99.506	-96.840	0,97

Capital utilizat	Capital mkt. Clearing	
-91.504	-89.993	0,98

	Imports (base)	New	New/Base
SITC0&1	93.597	90.130	0,96
SITC2	927	957	1,03
SITC3	164.826	124.127	0,75
SITC5	270.455	265.208	0,98
SITC6	94.659	94.301	1,00
SITC7	304.374	295.982	0,97
SITC8	151.325	151.832	1,00
SERVICES	84.640	81.100	0,96

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,03	0,92
SITC2	0,02	0,03	0,01	0,02	0,92	0,01	0,05	0,01	0,02	0,91
SITC3	0,04	0,03	0,17	0,02	0,73	0,03	0,03	0,13	0,02	0,79
SITC5	0,03	0,26	0,01	0,11	0,59	0,02	0,29	0,01	0,08	0,59
SITC6	0,04	0,27	0,03	0,07	0,59	0,03	0,31	0,02	0,05	0,59
SITC7	0,02	0,47	0,03	0,19	0,30	0,01	0,52	0,02	0,14	0,31
SITC8	0,01	0,23	0,01	0,08	0,67	0,00	0,26	0,01	0,06	0,67
Services	0,01	0,01	0,01	0,01	0,94	0,01	0,02	0,01	0,01	0,95

EU INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (30%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	500.113	1,00
SITC2	1.547	1.552	1,00
SITC3	120.667	120.393	1,00
SITC5	137.955	137.291	1,00
SITC6	12.407	12.418	1,00
SITC7	129.956	126.657	0,97
SITC8	171.272	171.805	1,00
Services	588.023	590.039	1,00
Nontraded	1.055.826	1.059.466	1,00
Gov't cons	519.525	521.316	1,00
Savings(K)	925.073	928.261	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0259	1,00
SITC2	1,0887	1,0886	1,00
SITC3	1,0092	1,0150	1,01
SITC5	1,0297	1,0382	1,01
SITC6	1,0290	1,0316	1,00
SITC7	1,0233	1,0536	1,03
SITC8	1,0296	1,0300	1,00
Services	1,0144	1,0145	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0259	1,00
Real exch. r (rer)	0,9941	0,9893	1,00

Total Imp. (timp)	1.362.497	1.260.474	0,93
Total Exp.(texp)	1.088.236	1.078.739	0,99

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.325.172	1,00
SITC2	23.667	23.625	1,00
SITC3	498.538	506.619	1,02
SITC5	569.714	576.770	1,01
SITC6	269.515	270.079	1,00
SITC7	488.111	494.760	1,01
SITC8	438.311	438.679	1,00
Services	1.936.280	1.942.062	1,00
Nontraded	2.262.422	2.268.924	1,00
	7.807.912	7.846.690	1,00

Utility	5,7715	5,7724	0,9984 loss
Hous exp.	4.219.348	4.233.892	Equivalent variation:
Income (M)	4.219.348	4.233.892	0,9984 loss

Compensating variation:

Total VAD	3.728.423	3.742.967
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.233.892

Trade Balance condition		
-274.262	-181.735	0,66

Labor Employ	Labor mkt. Clearing	
-99.506	-90.536	0,91

Capital utilizat	Capital mkt. Clearing	
-91.504	-85.931	0,94

	Imports (base)	New	New/Base
SITC0&1	93.597	85.365	0,91
SITC2	927	908	0,98
SITC3	164.826	110.011	0,67
SITC5	270.455	258.760	0,96
SITC6	94.659	92.364	0,98
SITC7	304.374	291.186	0,96
SITC8	151.325	148.664	0,98
SERVICES	84.640	75.521	0,89

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,03	0,92
SITC2	0,02	0,03	0,01	0,02	0,92	0,01	0,05	0,01	0,02	0,92
SITC3	0,04	0,03	0,17	0,02	0,73	0,03	0,03	0,12	0,02	0,81
SITC5	0,03	0,26	0,01	0,11	0,59	0,02	0,30	0,01	0,07	0,60
SITC6	0,04	0,27	0,03	0,07	0,59	0,02	0,31	0,02	0,04	0,60
SITC7	0,02	0,47	0,03	0,19	0,30	0,01	0,53	0,02	0,12	0,32
SITC8	0,01	0,23	0,01	0,08	0,67	0,00	0,26	0,01	0,05	0,68
Services	0,01	0,01	0,01	0,01	0,94	0,01	0,02	0,01	0,01	0,95

EU AND CEFTA INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (10%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	498.291	1,00
SITC2	1.547	1.542	1,00
SITC3	120.667	120.009	0,99
SITC5	137.955	138.778	1,01
SITC6	12.407	12.527	1,01
SITC7	129.956	129.092	0,99
SITC8	171.272	172.477	1,01
Services	588.023	586.003	1,00
Nontraded	1.055.826	1.052.057	1,00
Gov't cons	519.525	517.671	1,00
Savings(K)	925.073	921.770	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0225	1,00
SITC2	1,0887	1,0883	1,00
SITC3	1,0092	1,0111	1,00
SITC5	1,0297	1,0199	0,99
SITC6	1,0290	1,0155	0,99
SITC7	1,0233	1,0265	1,00
SITC8	1,0296	1,0188	0,99
Services	1,0144	1,0143	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0181	1,00
Real exch. r (rer)	0,9941	0,9969	1,00

Total Imp. (timp)	1.362.497	1.376.542	1,01
Total Exp.(texp)	1.088.236	1.093.735	1,01

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.315.285	1,00
SITC2	23.667	23.619	1,00
SITC3	498.538	497.094	1,00
SITC5	569.714	561.219	0,99
SITC6	269.515	265.537	0,99
SITC7	488.111	488.320	1,00
SITC8	438.311	431.375	0,98
Services	1.936.280	1.928.927	1,00
Nontraded	2.262.422	2.255.590	1,00
	7.807.912	7.766.966	0,99

			Compensating variation:
Utility	5,7715	5,7704	1,0009 gain
Hous exp.	4.219.348	4.204.286	Equivalent variation:
Income (M)	4.219.348	4.204.286	1,0009 gain

Total VAD	3.728.423	3.713.361
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.204.286

Trade Balance condition			
-274.262	-282.807	1,03	

Labor Employ	Labor mkt. Clearing	
-99.506	-108.566	1,09

Capital utilizat	Capital mkt. Clearing	
-91.504	-97.507	1,07

	Imports (base)	New	New/Base
SITC0&1	93.597	97.276	1,04
SITC2	927	1.130	1,22
SITC3	164.826	146.793	0,89
SITC5	270.455	275.391	1,02
SITC6	94.659	97.981	1,04
SITC7	304.374	301.359	0,99
SITC8	151.325	155.966	1,03
SERVICES	84.640	102.951	1,22

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,04	0,91
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,05	0,01	0,02	0,90
SITC3	0,04	0,03	0,17	0,02	0,73	0,04	0,03	0,15	0,02	0,76
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,29	0,01	0,09	0,58
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,30	0,02	0,06	0,58
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,50	0,02	0,16	0,30
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,25	0,01	0,07	0,66
Services	0,01	0,01	0,01	0,01	0,94	0,02	0,02	0,01	0,01	0,93

EU AND CEFTA INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	497.481	1,00
SITC2	1.547	1.536	0,99
SITC3	120.667	119.812	0,99
SITC5	137.955	139.494	1,01
SITC6	12.407	12.556	1,01
SITC7	129.956	130.867	1,01
SITC8	171.272	173.113	1,01
Services	588.023	583.750	0,99
Nontraded	1.055.826	1.047.981	0,99
Gov't cons	519.525	515.665	0,99
Savings(K)	925.073	918.199	0,99

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0202	1,00
SITC2	1,0887	1,0882	1,00
SITC3	1,0092	1,0089	1,00
SITC5	1,0297	1,0108	0,98
SITC6	1,0290	1,0093	0,98
SITC7	1,0233	1,0086	0,99
SITC8	1,0296	1,0111	0,98
Services	1,0144	1,0143	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0136	0,99
Real exch. r (rer)	0,9941	1,0013	1,01

Total Imp. (timp)	1.362.497	1.424.310	1,05
Total Exp.(texp)	1.088.236	1.102.593	1,01

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.309.167	0,99
SITC2	23.667	23.619	1,00
SITC3	498.538	492.092	0,99
SITC5	569.714	553.808	0,97
SITC6	269.515	263.963	0,98
SITC7	488.111	484.390	0,99
SITC8	438.311	426.690	0,97
Services	1.936.280	1.922.020	0,99
Nontraded	2.262.422	2.248.334	0,99
	7.807.912	7.724.082	0,99

Utility	5,7715	5,7694	1,0024
Hous exp.	4.219.348	4.187.996	
Income (M)	4.219.348	4.187.996	1,0024

Compensating variation: gain

Equivalent variation: gain

Total VAD	3.728.423	3.697.071
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.187.996

Trade Balance condition		
-274.262	-321.718	1,17

Labor Employ	Labor mkt. Clearing	
-99.506	-118.429	1,19

Capital utilizat	Capital mkt. Clearing	
-91.504	-103.934	1,14

	Imports (base)	New	New/Base
SITC0&1	93.597	104.021	1,11
SITC2	927	1.177	1,27
SITC3	164.826	165.004	1,00
SITC5	270.455	281.999	1,04
SITC6	94.659	99.663	1,05
SITC7	304.374	306.403	1,01
SITC8	151.325	160.079	1,06
SERVICES	84.640	108.269	1,28

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,04	0,91
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,05	0,01	0,02	0,90
SITC3	0,04	0,03	0,17	0,02	0,73	0,04	0,03	0,17	0,02	0,73
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,28	0,01	0,11	0,56
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,30	0,03	0,06	0,57
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,48	0,03	0,19	0,29
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,25	0,01	0,08	0,65
Services	0,01	0,01	0,01	0,01	0,94	0,02	0,02	0,01	0,01	0,93

EU AND CEFTA INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (20%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	498.926	1,00
SITC2	1.547	1.546	1,00
SITC3	120.667	120.165	1,00
SITC5	137.955	138.286	1,00
SITC6	12.407	12.508	1,01
SITC7	129.956	127.826	0,98
SITC8	171.272	172.049	1,00
Services	588.023	587.662	1,00
Nontraded	1.055.826	1.055.059	1,00
Gov't cons	519.525	519.147	1,00
Savings(K)	925.073	924.400	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0241	1,00
SITC2	1,0887	1,0883	1,00
SITC3	1,0092	1,0127	1,00
SITC5	1,0297	1,0265	1,00
SITC6	1,0290	1,0199	0,99
SITC7	1,0233	1,0396	1,02
SITC8	1,0296	1,0242	0,99
Services	1,0144	1,0143	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0213	1,00
Real exch. r (rer)	0,9941	0,9937	1,00

Total Imp. (timp)	1.362.497	1.336.758	0,98
Total Exp.(texp)	1.088.236	1.087.460	1,00

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.319.711	1,00
SITC2	23.667	23.621	1,00
SITC3	498.538	500.711	1,00
SITC5	569.714	566.668	0,99
SITC6	269.515	266.695	0,99
SITC7	488.111	491.333	1,01
SITC8	438.311	434.790	0,99
Services	1.936.280	1.934.044	1,00
Nontraded	2.262.422	2.260.936	1,00
	7.807.912	7.798.510	1,00

Utility	5,7715	5,7711	0,9998
Hous exp.	4.219.348	4.216.280	
Income (M)	4.219.348	4.216.280	0,9998

Compensating variation: loss

Equivalent variation: loss

Total VAD	3.728.423	3.725.355
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.216.280

Trade Balance condition		
-274.262	-249.298	0,91

Labor Employ	Labor mkt. Clearing	
-99.506	-101.303	1,02

Capital utilizat	Capital mkt. Clearing	
-91.504	-92.775	1,01

	Imports (base)	New	New/Base
SITC0&1	93.597	91.842	0,98
SITC2	927	1.092	1,18
SITC3	164.826	132.369	0,80
SITC5	270.455	269.586	1,00
SITC6	94.659	96.509	1,02
SITC7	304.374	296.580	0,97
SITC8	151.325	152.488	1,01
SERVICES	84.640	98.596	1,16

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,03	0,92
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,05	0,01	0,02	0,90
SITC3	0,04	0,03	0,17	0,02	0,73	0,05	0,03	0,13	0,02	0,78
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,29	0,01	0,08	0,59
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,30	0,02	0,05	0,58
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,51	0,02	0,14	0,31
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,26	0,01	0,06	0,67
Services	0,01	0,01	0,01	0,01	0,94	0,02	0,02	0,01	0,01	0,93

EU AND CEFTA INTEGRATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY (30%)

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	499.410	1,00
SITC2	1.547	1.549	1,00
SITC3	120.667	120.285	1,00
SITC5	137.955	137.944	1,00
SITC6	12.407	12.496	1,01
SITC7	129.956	126.915	0,98
SITC8	171.272	171.756	1,00
Services	588.023	588.871	1,00
Nontraded	1.055.826	1.057.245	1,00
Gov't cons	519.525	520.223	1,00
Savings(K)	925.073	926.316	1,00

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0252	1,00
SITC2	1,0887	1,0884	1,00
SITC3	1,0092	1,0138	1,00
SITC5	1,0297	1,0312	1,00
SITC6	1,0290	1,0231	0,99
SITC7	1,0233	1,0492	1,03
SITC8	1,0296	1,0281	1,00
Services	1,0144	1,0143	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0237	1,00
Real exch. r (rer)	0,9941	0,9914	1,00

Utility	5,7715	5,7717	0,9990 Compensating variation: loss
Hous exp.	4.219.348	4.225.019	Equivalent variation:
Income (M)	4.219.348	4.225.019	0,9990 loss

Total Imp. (timp)	1.362.497	1.303.228	0,96
Total Exp.(texp)	1.088.236	1.082.996	1,00

Total VAD	3.728.423	3.734.094
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.322.877	1,00
SITC2	23.667	23.623	1,00
SITC3	498.538	503.311	1,01
SITC5	569.714	570.639	1,00
SITC6	269.515	267.539	0,99
SITC7	488.111	493.608	1,01
SITC8	438.311	437.262	1,00
Services	1.936.280	1.937.786	1,00
Nontraded	2.262.422	2.264.833	1,00
	7.807.912	7.821.477	1,00

Total Income		
	4.219.348	4.225.019

Trade Balance condition		
-274.262	-220.232	0,80

Labor Employ	Labor mkt. Clearing	
-99.506	-96.010	0,96

Capital utilizat	Capital mkt. Clearing	
-91.504	-89.330	0,98

	Imports (base)	New	New/Base
SITC0&1	93.597	87.404	0,93
SITC2	927	1.059	1,14
SITC3	164.826	120.772	0,73
SITC5	270.455	264.477	0,98
SITC6	94.659	95.213	1,01
SITC7	304.374	292.106	0,96
SITC8	151.325	149.518	0,99
SERVICES	84.640	94.984	1,12

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,05	0,00	0,03	0,92
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,05	0,01	0,02	0,91
SITC3	0,04	0,03	0,17	0,02	0,73	0,05	0,03	0,11	0,02	0,79
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,29	0,01	0,07	0,59
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,31	0,02	0,04	0,59
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,52	0,02	0,12	0,31
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,26	0,01	0,05	0,67
Services	0,01	0,01	0,01	0,01	0,94	0,02	0,02	0,01	0,01	0,94

MULTILATERAL LIBERALIZATION COMPARED TO THE COMPUTATIONAL BENCHMARK - HUNGARY

Final Consumption - real (rhouscons)

	Base Year	New	New/Base
SITC0+1	499.179	497.562	1,00
SITC2	1.547	1.530	0,99
SITC3	120.667	119.409	0,99
SITC5	137.955	140.006	1,01
SITC6	12.407	12.574	1,01
SITC7	129.956	131.131	1,01
SITC8	171.272	173.588	1,01
Services	588.023	581.316	0,99
Nontraded	1.055.826	1.043.438	0,99
Gov't cons	519.525	513.429	0,99
Savings(K)	925.073	914.218	0,99

pifcb/pifcn	Base Year	New	New/Base
SITC0+1	1,0243	1,0156	0,99
SITC2	1,0887	1,0878	1,00
SITC3	1,0092	1,0079	1,00
SITC5	1,0297	1,0027	0,97
SITC6	1,0290	1,0035	0,98
SITC7	1,0233	1,0022	0,98
SITC8	1,0296	1,0040	0,98
Services	1,0144	1,0141	1,00
Nontraded	1,0149	1,0149	1,00
Gov't cons	1,0149	1,0149	1,00
Savings(K)	1,0000	1,0000	1,00

NT price (pNT)	1,0149	1,0149	1,00
T pr. Index (pTi)	1,0209	1,0099	0,99
Real exch. r (rer)	0,9941	1,0050	1,01

Total Imp. (timp)	1.362.497	1.475.976	1,08
Total Exp.(texp)	1.088.236	1.109.941	1,02

	Output base	Output new	New/Base
SITC0+1	1.321.354	1.296.828	0,98
SITC2	23.667	23.595	1,00
SITC3	498.538	488.188	0,98
SITC5	569.714	546.957	0,96
SITC6	269.515	262.440	0,97
SITC7	488.111	482.549	0,99
SITC8	438.311	422.053	0,96
Services	1.936.280	1.913.698	0,99
Nontraded	2.262.422	2.240.368	0,99
	7.807.912	7.676.675	0,98

Utility	5,7715	5,7681	1,0038
Hous exp.	4.219.348	4.169.841	
Income (M)	4.219.348	4.169.841	1,0038

Compensating variation: gain

Equivalent variation: gain

Total VAD	3.728.423	3.678.916
Remittances	0	0
Tax transfers	207.816	207.816
ST ext. debt	283.109	283.109
Total Income	4.219.348	4.169.841

Trade Balance condition		
-274.262	-366.035	1,33

Labor Employ	Labor mkt. Clearing	
-99.506	-129.026	1,30

Capital utilizat	Capital mkt. Clearing	
-91.504	-111.492	1,22

	Imports (base)	New	New/Base
SITC0&1	93.597	115.691	1,24
SITC2	927	1.371	1,48
SITC3	164.826	171.519	1,04
SITC5	270.455	286.543	1,06
SITC6	94.659	100.936	1,07
SITC7	304.374	307.016	1,01
SITC8	151.325	163.242	1,08
SERVICES	84.640	131.962	1,56

Geographic distribution of imports & domestic prod.

base	CEFTA	EU	FCP	ROW	Domestic	CEFTA	EU	FCP	ROW	Domestic
SITC0+1	0,00	0,04	0,00	0,04	0,92	0,00	0,04	0,00	0,05	0,90
SITC2	0,02	0,03	0,01	0,02	0,92	0,02	0,04	0,02	0,03	0,88
SITC3	0,04	0,03	0,17	0,02	0,73	0,04	0,03	0,18	0,02	0,72
SITC5	0,03	0,26	0,01	0,11	0,59	0,03	0,27	0,02	0,12	0,56
SITC6	0,04	0,27	0,03	0,07	0,59	0,04	0,29	0,03	0,07	0,56
SITC7	0,02	0,47	0,03	0,19	0,30	0,02	0,47	0,03	0,19	0,28
SITC8	0,01	0,23	0,01	0,08	0,67	0,01	0,25	0,01	0,09	0,64
Services	0,01	0,01	0,01	0,01	0,94	0,02	0,02	0,02	0,02	0,91